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ABSTRACT

The reading responses of 80 second grade students to words in context and words in isolation were analyzed. The children were tested individually with four oral reading selections (kindergarten through third grade levels), a set of comprehension questions, and a word list. The children recognized fewer words in isolation than in context. The recognition in context of a word unknown in isolation depended on its grammatical function, its difficulty, the frequency of its use, its repetition in context, and the adequacy of contextual cues. An index of graphic similarity produced higher scores for substitutions occurring in isolation than for substitutions in context, indicating that a graphic display of a word was a more salient cue for words in isolation than for words in context. Unexpectedly, oral reading comprehension was not more highly correlated with words in context than with words in isolation. Neither the frequency nor the proportion of semantically acceptable substitutions correlated significantly with oral or silent reading comprehension. Neither the frequency nor the proportion of syntactically acceptable substitutions predicted oral reading comprehension: but the frequency of such substitutions was the better predictor of silent reading comprehension. Significant correlations among the various subclasses of substitutions were indications that a common factor across subclasses was significantly related to reading comprehension. (RL)

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Substitution Errors in the Oral Reading of Words from a List, and of the Same Words in Context

Sister M. Roderick MacMullin

Is the context of connected prose a significant help to second graders in recognizing words unknown in isolation? Would their performance on word recognition in context, rather than their performance on word recognition in isolation, be a more reliable basis from which to generate expectations regarding their comprehension? As far as reading comprehension is concerned, can semantically and syntactically acceptable substitutions be ignored? These questions prompted the present study.

The purpose of this study, then, was to compare the frequency and nature of substitution errors under two conditions: (1) substitutions occurring in an untimed presentation, on words in a list, known as target words; (2) substitutions occurring on the same target words presented in context. One goal was to determine the significance of context as an aid to word recognition, and to compare the relationships of word recognition under each condition with reading comprehension. A second goal was to examine the relationships between reading comprehension and semantically acceptable and syntactically acceptable substitutions.

Background

Weber (1968), reviewing early studies of oral reading errors, indicated a difficulty in comparing and interpreting these studies for various reasons, but particularly because of the utilization of different criteria for counting errors. These early studies, concen-

trating on the quantification of errors at the level of the letter and/or word, implied a linear relationship between the number of errors and reading comprehension. Furthermore, they frequently implied a need to remediate each error in order to improve comprehension. Recent intensive studies, however, such as those of Weber (1970), Goodman and Burke (1968, 1973), and the miscue studies, reported that both good and poor readers err in identifying words even when reading beyond their independent level, and that such errors do not always impede comprehension. Again, Hood (1976), in evaluating recent studies of oral reading errors, indicated that, for various reasons, recent studies are just as difficult to compare and interpret as the early studies. For example, researchers have used different systems of counting errors; have used different definitions of contexual constraint; have provided different tasks for subjects; have provided little reliability of error scores; have made little use of statistical tests, and when statistical tests were used, often the tests were inappropriate.

Goodman (1965), after comparing word recognition in isolation and in context by having children read the same words under each condition, concluded that context was a significant aid to word recognition. His second graders made a mean of 20.1 substitutions in isolation and a mean of 5.1 substitutions in context. Clayman (1972) maintained that the results of her study did not support those of Goodman. Procedural differences in the two studies could possibly account for the conflicting results. However, as suggested in the miscue studies, when children read words in isolation, they have available to them only graphic cues, while in context they have available to them semantic and

syntactic cues, as well as graphic cues. With more cues available to them in context, it would seem quite feasible for children to recognize more words in context than in isolation. For this reason, in the present study the prediction was made that children would recognize more words in context than in isolation.

The advantage gained by word recognition in context was expected to assist in producing a stronger correlation between word recognition in context and reading comprehension than between word recognition in isolation and reading comprehension. Furthermore, the process of utilizing context as an aid to word recognition is similar in some respects to that required in the CLOZE method of testing comprehension. The CLOZE method has been recognized as a valid means of testing reading comprehension (Rankin, 1959, 1965; Culhane, 1970; Bormuth, 1975). Thus, it would appear that the ability to utilize context in order to recognize words would be related to the ability to comprehend the reading material. Good comprehenders were expected to be more efficient than poor comprehenders in utilizing context in the recognition of words.

Studies after the mid 60's generally examined errors in oral reading in relation to the meaning and structure of the language. The effect of semantically and syntactically acceptable substitutions on comprehension has been closely examined in the miscue studies. These studies, however, generally used a very small number of subjects. Y. Goodman (1967), Goodman and Burke (1968), Burke (1968), Allen (1969), Menosky (1971), and Goodman and Burke (1973) reported no linear

relationship between the number of miscues and reading comprehension. Goodman and Burke (1973) maintained that the best single indicator of reading proficiency is the percentage of miscues semantically acceptable. Menosky (1971) concluded that the frequency of miscues per hundred words was not an important factor in reading comprehension. Clay (1969), however, stated that her research confirmed an error response of five percent or less as the optimum level for promoting children to another reader. Since the occurrence of semantically acceptable substitutions would seem to indicate that students were reading for meaning, a significant positive correlation between reading comprehension and semantically acceptable substitutions was predicted.

Clay (1968), Weber (1970), and Coomber (1972) reported that their young readers expected the sentences they read to conform to the rules of their language. These studies indicated that syntax exerts a very strong influence on errors in oral reading. Moreover, little difference was observed between groups of good and poor readers in their ability to use the syntax of their language. The percentages of syntactically acceptable substitutions made by groups of good and poor readers differed little. In exploring the relationship between syntactically acceptable substitutions and reading comprehension, therefore, it did not appear justifiable to make predictions regarding the strength or direction of the correlations to be obtained.

In addition, Weber (1970) observed that as the difficulty of reading material increased, children directed more attention to graphic cues when reading in context. At such times, an increase was noted in

the number of syntactically unacceptable substitutions occurring. Besides, these syntactically unacceptable substitutions were more graphically similar to the printed word than were the syntactically acceptable substitutions. Thus, it seems that when children are concentrating on graphic cues in reading, and are not directing adequate attention to semantic and syntactic cues, their substitutions tend to be more graphically similar to the printed word. While reading words in isolation, children necessarily concentrate on graphic cues, since these are the only cues available to them. For this reason it could be expected that substitutions occurring on words in isolation would have a higher graphic similarity score than substitutions made in context. Also, more substitutions were expected to occur in isolation than in context. This, too, would help cause a higher graphic similarity score. For these reasons it was predicted that substitutions made in isolation would have a higher graphic similarity score than substitutes occurring in context.

Substitution errors were the focus of attention in the present study because, as suggested by Coomber (1972), they provide much insight into the reading process both at the level of the word and at the level of the sentence. Moreover, since substitutions generally occur with greater frequency than any type of error (Ilg and Ames, 1950; Goodman, 1965; Weber, 1968), they constitute a feasible subject for analysis.

The Study

The current study, by testing for a significant difference in the ability of second graders to read words in isolation and to read the same words in context, was an extension of Goodman's (1965) study. By examining the syntactic and semantic acceptability of substitution errors, this study was an extension of the miscue studies. It differed from the miscue studies in using a larger sample. It differed from Goodman's study by examining the relationship between substitution errors and reading comprehension, and by examining the different subclasses of substitution errors made on words in isolation and in context. In addition, an attempt was made to provide for more control of the variables by assigning the same task to all children, and statistically controlling for difficulty.

It was hoped that information obtained through the present study would provide additional insights into the reading process, indicating the extent to which the children's control over the syntax of their language influences their errors in oral reading. Also, it was expected that the information obtained would be valuable in assessing criteria established by oral reading tests for evaluating reading performance. Finally, it was expected that the study might shed some light on when to ignore an error in oral reading.

Hypotheses. The following hypotheses were tested.

1. When the same words are presented in isolation and in context, second-grade children will recognize fewer words in isolation.

2. The graphic similarity score of substitution errors on words

in isolation is higher than the graphic similarity score of substitutions made on words in context.

3. Oral and/or silent reading comprehension scores are more highly correlated with word recognition scores obtained in context than with word recognition scores obtained in isolation.

4. The frequency or the proportion of semantically acceptable substitutions in sentences is correlated significantly and positively with oral and/or silent reading comprehension.

5. The frequency or the proportion of syntactically acceptable substitutions in sentences is significantly correlated with oral and/or silent reading comprehension.

Operational definitions. In this study several terms were defined operationally. As described under the subheading Materials, context referred to selections to be used for oral reading, while words in isolation referred to a list of words chosen from the reading selections, and referred to as target words. Substitutions were words substituted for target words in isolation, and for any word in context. The graphic similarity score, determined by an index of graphic similarity (Weber, 1970), described the degree to which substitutions approximated the printed word.

Subclasses of substitution errors referred to substitution errors categorized as graphophonemic substitutions, nonwords, semantically acceptable substitutions, semantically unacceptable substitutions, syntactically acceptable substitutions, syntactically unacceptable substitutions, semantically and syntactically acceptable substitutions.

Semantically acceptable substitutions were those substitutions which did not change the meaning of the sentence in which they occurred, while semantically unacceptable substitutions were those which did change the meaning of the sentence. Syntactically acceptable substitutions were those which did not upset the grammatical structure of the sentence in which they occurred, while syntactically unacceptable substitutions were those which did upset the grammatical structure of the sentence in which they occurred. The subclass, semantically and syntactically acceptable substitutions, comprised substitutions which were acceptable in the sentence, both semantically and syntactically.

Graphophonemic errors referred to substitutions which resulted from grapheme-phoneme irregularities. Such substitutions as breathe for breath, and ground for grown were considered graphophonemic errors.

Nonwords referred to substitutions which were not real words. Such words were not listed in the Random House Dictionary of the English Language (1967).

Analysis of data. Substitutions which occurred on target words in isolation and in context were classified as nonwords and as graphophonemic errors. All substitutions in context, as well as those on target words, were classified according to their semantic and syntactic acceptability in the sentences in which they occurred. In the miscue studies, substitutions had to be syntactically acceptable in order to be classified as semantically acceptable. In this study, however, when a substitution reflected a grammatical error characteristic of the oral language of the child, the substitution was classified as semantically

acceptable if the meaning of the sentence was evident. All nonwords were classified as semantically unacceptable. Nonwords were classified as syntactically acceptable when they appeared to be replacing the expected response in form and in function. When nonwords included the same inflectional endings or affixes as the expected response, they were considered as syntactically acceptable. Examples of substitutions in context classified into the various subclasses are found in the sentences below. (ER = the expected response; OR = the oral response.)

ER Young Blue held his breath.

OR Young Blue held his breathe.

Breathe was classified as a graphophonemic error, as semantically unacceptable and as syntactically unacceptable.

ER He moved his flukes up and down to push himself through the water.

OR He moved his flekes up and down to push hisself through the water.

Flekes was classified as a nonword, as semantically unacceptable, and as syntactically acceptable. Hisself was classified as semantically acceptable and as syntactically unacceptable.

ER The mother whale began teaching the baby whale from the time he came into the world.

OR The mother whale began teaching the baby whale from the time he entered the world.

Entered was classified as semantically acceptable and as syntactically acceptable.

Method

Subjects. The second-grade population of a rural consolidated school in the [redacted] participated in this study. The school is situated on the outskirts of the town of [redacted], a small university town of approximately 10,000 people. Based on the occupation of parents, the opinion of the principal and teachers of the school was that approximately 20%, 70% and 10%, respectively, of this population could be classified as being of low, low middle, and of high middle socioeconomic status.

The 86 students, 39 boys and 47 girls, ranged in age from 89 months to 114 months, with a mean age of 98.7 months. The IQs of the students, as measured by the Otis-Lennon Mental Ability Test, ranged from 73 to 132, with a mean IQ of 105.7. The mean reading grade for the population, as measured by the Canadian Tests of Basic Skills, was 3.1.

Materials. The materials utilized in the study consisted of two standardized tests, four oral reading selections, two sets of comprehension questions, and two word lists. The standardized measures consisted of the Otis-Lennon Mental Ability Test, Elementary 1, Level J, and the silent reading subtest from the 1976 edition of the Primary Battery of the Canadian Tests of Basic Skills.

The four oral reading selections were chosen, respectively, from readers of primary, first, second, and third grades, with 96, 134, 203, and 159 words in each selection, respectively. The selections for the first three grades came from The Canadian Reading Development Series,

and the fourth selection was taken from Young Canadian Reading Series, readers not being used in the school.

Two sets of comprehension questions, based on the oral reading selections, were constructed by the examiner. The first set of comprehension questions included 11 from primary, and 17, 15, and 18, respectively, from the selections of first, second and third grades. The second set of comprehension questions was chosen from the first set as described under the subheading Procedure.

One word list consisted of 100 words chosen from the oral reading selections. Fifteen words were selected from each of the primary and first-grade selections, and 35 words from each of the selections for second and third grades. Each word was printed on a 4.5 x 2.5 inch card. The second word list, consisting of 50 words, was selected from the first list as described under the subheading Procedure.

Procedure. The population was randomly divided into two groups of 43 children each. Group 1 consisted of 14 boys and 29 girls, while Group 2 consisted of 25 boys and 18 girls. During the month of May, 1977, the Otis-Lennon Mental Ability Test and the silent reading subtest from the Canadian Tests of Basic Skills were administered. During April and May, 1977, the examiner tested individually each child. Two male children had transferred to another school before completion of the testing, so that 41 children were tested in Group 1.

The four oral reading selections, the first set of comprehension questions, and the first word list were administered to each student in Group 1. The oral reading selections and word list were administered

in counterbalanced order. After reading a selection, the child was asked the comprehension questions for that selection. Before beginning to test a student, the task was explained. The child was told s/he would be shown words on cards. If s/he knew the word, s/he would say it. If s/he did not know the word, s/he was asked to attempt to pronounce the word as best s/he could. When the child indicated that s/he did not know the word and did not want to deal with it any longer, the next word was presented. The words were presented on cards one by one, and the examiner recorded the child's responses on mimeographed copies of the word list. If the child failed to respond to 10 consecutive words and exhibited frustration, the testing on the word list was discontinued.

When the test on words in isolation was completed, the child was asked to read orally each of the four reading selections. A picture accompanied each selection to which the student's attention was briefly directed as a readiness for reading. Neither the story nor the vocabulary of the selection was discussed. The child was informed that the examiner would not be helping with unknown words, and s/he was encouraged to figure out words as best s/he could.

As the student read orally, the examiner recorded all substitutions on the target words in the selection. When a student exhibited excessive frustration, reading was discontinued. When the reading of a selection was completed, the student was asked the comprehension questions for that selection. The testing time for each child in Group 1 ranged from 25 to 50 minutes. When it was evident that the testing

would not be completed in 25 minutes, a recess was provided after approximately 20 minutes of testing.

Fourteen children from Group 1 were retested for the purpose of determining the reliability of the testing. Reliability coefficients were computed for words recognized in isolation, words recognized in context, and for oral reading comprehension.

After testing Group 1, the data on words presented in isolation were used to determine the index of difficulty of each of the 100 words, so that a second list of 50 words, controlled for difficulty, could be constructed. This list was to be used in testing Group 2. Among the 50 words chosen for the second list, six were randomly chosen from 38 words ranging in difficulty from .05 to .29. Forty-one words with a difficulty range of .30 to .64 were selected, along with the three words with a difficulty range of .65 to .85. Eighteen words ranging in difficulty from 0 to .05 were discarded.

The index of difficulty and the index of discriminability of each of the comprehension questions used with Group 1 were determined, and on the basis of this information, eight questions were chosen to accompany each oral reading selection for testing Group 2. The questions chosen to accompany the selections of primary, first, second and third grades, respectively, had a difficulty range of .19 to .69, .38 to .77, .35 to .92, and .46 to .81. The most difficult questions for the first and second grades, and the two most difficult questions for the third-grade selection were modified to produce easier questions. The questions for the selections of primary, first, second and third grades,

respectively, had a discriminability range of .60 to .75, .57 to 1.00, .73 to 1.00, and .67 to 1.00.

The 43 children in Group 2 were tested individually using the same four oral reading selections, the second list of 50 words controlled for difficulty, and the second set of comprehension questions controlled for difficulty and discriminability. Counterbalanced order was observed in testing word recognition in isolation and in reading the oral reading selections. As the child read the words orally in isolation, and as s/he read the selections orally, all substitution errors were recorded. The testing procedures used with Group 1 were the same as those utilized with Group 2. Most students in Group 2 required about 25 minutes for testing, but when a student needed more time, a recess was given at an appropriate stage in the testing. Each testing session was tape recorded.

Each individual tape was reviewed by the examiner, and the substitution errors recorded on mimeographed copies were checked. A female high school teacher reviewed the tapes and rechecked the examiner's recordings. In the work of the examiner and the high school teacher, disagreement existed on six substitution errors and two comprehension questions. To resolve these differences in scoring, the sections of seven tapes were reviewed by a third female high school teacher. Her decision was accepted. After this, the analysis of data was begun.

First, the mean number of target words recognized in isolation and in context by Group 2 was calculated, and the means compared to determine the significance of context as an aid to word recognition. Then, the mean graphic similarity score for substitutions occurring on target

words under each condition was determined, using an index of similarity devised by Weber (1970). The means were compared to find out if substitutions occurring in isolation were more graphically similar than those in context.

The next step involved the classification of substitution errors on target words under each condition, as well as all substitutions in total context. Substitutions on target words in isolation and in context were classified as graphophonemic and nonwords. Substitutions on target words in context, as well as all other substitutions in context, were classified into the various subclasses for their semantic and syntactic acceptability and unacceptability. The frequency of substitutions in each subclass for each subject was tallied, and the percentages of substitutions assigned to each subclass were calculated.

In categorizing the substitutions for semantic and syntactic acceptability and unacceptability, the examiner and a high school teacher worked separately and categorized each substitution error for each subject. Then, two elementary teachers compared the decisions made on each of the substitutions, and noted those on which disagreement existed. The examiner and the high school teacher then discussed each substitution on which they disagreed, and resolved the differences by discussion. In all, the examiner and the high school teacher had disagreed in their decisions on 26 substitutions.

Finally, correlations were computed for oral and silent reading comprehension and word recognition in isolation and in context; between oral and silent reading comprehension and semantically acceptable sub-

stitutions; and between oral and silent reading comprehension and syntactically acceptable substitutions. In correlations involving semantically or syntactically acceptable substitutions, two different sets of scores were utilized for the substitutions. One set, referred to as transformed scores, took into consideration the total output of substitutions. To obtain these transformed scores, the total number of substitutions for each student was calculated, and the proportions of the total which were semantically and syntactically acceptable were calculated for each student. The proportions were then transformed to radians for the purpose of stabilizing the variance in the distributions of proportions. The transformed scores were used in correlations involving the proportions of semantically or syntactically acceptable substitutions. The second set of scores, referred to as frequency scores, represented the number of semantically or syntactically acceptable substitutions made by each subject, disregarding the total output of substitutions. They were used in correlations involving the frequency of the substitutions.

Results and Conclusions

Of the 41 students tested in Group 1, one child could not complete the reading task. Of the 43 tested in Group 2, three children could not complete the task. The following results were based on the analysis of data collected on the 40 children in each group who completed the reading task. The .05 level was set as the critical value for all statistically tests.

The Student *t*-ratio for independent groups, used to compare the

two groups, produced no significant differences between the groups in age, t (78) = -1.6250, $p > .05$; in IQ, t (78) - 1.2695, $p > .05$; or in silent reading comprehension, t (78) = 0, $p > .05$.

In order to compute reliability coefficients for test of word recognition in isolation and in context, and for oral reading comprehension, 14 children in Group 1 were retested. The Pearson product moment correlation employed produced significant correlations of .95, .95, and .95 for word recognition in isolation, word recognition in context, and oral reading comprehension, respectively, z = 11.14, $p < .0001$.

First hypothesis. It was hypothesized that when the same words were presented in isolation and in context, children would recognize fewer words in isolation. The student t-ratio for correlated samples, used to compare the recognition of target words in isolation and in context, produced significant results, t (39) = -3.88, $p < .0005$, one-tailed test. The total number of target words recognized by Group 2 in isolation was 1,342, and in context 1,446. The mean difference and the standard error of difference, respectively, were -2.6 and .67. Since the children recognized fewer words in isolation than in context, the first hypothesis was confirmed. For the population studied, context appeared to be a significant aid to word recognition, thereby confirming Goodman's (1965) findings.

While statistically a greater number of words was recognized in context than in isolation, the mean difference, however, was only -2.6. To find out why this mean difference was not greater, the data on the recognition of target words under each condition by 20 randomly chos-

en students, were examined. From the examination it appeared that the recognition in context of a word unknown in isolation depended on such factors as the grammatical function of the word, its difficulty or the frequency of its use, its repetition in context, and the adequacy of contextual cues.

For example, considering words recognized either only in context or only in isolation, nouns were recognized three times as often in context as in isolation, adjectives twice as often, and verbs appeared to have an equal chance of being recognized under either condition. The fact that grammatical function was not considered in choosing the target words, on which the comparsion of word recognition under the two conditions was based, may help to account for the small mean difference. Also, the number of errors made on the easiest or hardest words differed little. The greatest reduction in error rate from isolation to context was on words of medium difficulty, as based on the index of difficulty. When the word was in the student's oral or listening vocabulary, context seemed to help in its recognition. When the word was unfamiliar, even though phonetically regular, context did not appear to provide much help.

Second hypothesis. This hypothesis predicted that for substitutions occurring in isolation, the graphic similarity score would be higher than that for substitutions occurring in context. The graphic similarity score, indicating the degree of graphic similarity between a substitution and a target word, was computed by Weber's (1970) index of graphic similarity, GS = [(50F + 30V + 10C)/A + 5T + 27B + 18E]. The

Student t-ratio for correlated samples, used to compare the total graphic similarity score for substitutions made in isolation and in context, produced significant results, t (39) = 3.7068, $p < .0005$, one-tailed test. The total graphic similarity score for substitutions in isolation was 390,911, and in context 321,729. The mean difference and the standard error of difference, respectively, were 1,729.55 and 466.59. Because the graphic similarity score for substitutions occurring in isolation was greater than that for substitutions occurring in context, the second hypothesis was supported. Thus, the graphic display of a word appeared to be a more salient cue for word recognition in isolation than for word recognition in context.

An examination of the substitutions made under each condition by 20 randomly chosen students indicated that children, when reading words in isolation, directed more attention to the medial and final letters of words than when reading words in context. Also, substitutions on words in isolation tended to share more letters in common with the target words than substitutions made in context. Besides, more graphophonemic errors occurred in isolation than in context. Two words on which graphophonemic errors could occur, namely, were and breath, revealed the greatest reduction in error rate from isolation to context.

Third hypothesis. It was hypothesized that word recognition in context would produce a higher correlation with reading comprehension than word recognition in isolation. To test this third hypothesis, Pearson r correlations were computed between the scores for oral reading comprehension and the scores for word recognition in isolation and

in context, and also between the silent reading comprehension scores and each set of word recognition scores. A significant correlation of .4 was obtained for both the correlation of oral reading comprehension with word recognition in isolation, and the correlation of oral reading comprehension with word recognition in context, $z = 2.58$, $p < .01$. No significant difference existed between these correlations, Hotelling T (37) = 0, $p > .10$, one-tailed test. Thus, oral reading comprehension was not more highly correlated with word recognition in context than with word recognition in isolation.

Correlating silent reading comprehension with word recognition in isolation produced a significant correlation of .76, $z = 6.0583$, $p < .0001$. Correlating silent reading comprehension with word recognition in context produced a significant correlation of .79, $z = -6.5146$, $p < .0001$. These correlations were not significantly different, Hotelling T (37) = -1.0523, $p > .10$, one-tailed test. Silent reading comprehension was not more highly correlated with word recognition in context than with word recognition in isolation. Thus, the third hypothesis was not supported.

For the population studied, word recognition in neither isolation nor in context appeared to be a good predictor of oral reading comprehension. The correlation of .4, while statistically significant, is weak. Also, word recognition under either condition appeared to be equally as good as a predictor of silent reading comprehension. The correlations of .76 and .79 are not significantly different. Finally, word recognition under either condition appeared to be a better pre-

dictor of silent reading comprehension than of oral reading comprehension. The correlations of .76 and .79 for word recognition in isolation and in context, respectively, with silent reading comprehension, are significantly greater than the correlation of .4 for oral reading comprehension and word recognition under either condition ($p < .001$). Thus, it would seem that word recognition under either condition could be used with greater confidence to generate expectations regarding silent reading comprehension than oral reading comprehension.

Because of the advantage gained by word recognition in context, it was expected that reading comprehension would produce a stronger correlation with word recognition in context than with word recognition in isolation. Possibly the advantage gained by word recognition in context was not sufficiently significant to be reflected in a correlation with reading comprehension. It is also possible, however, that the advantage gained by word recognition in context was achieved at the expense of phrasing. If ideas gleaned in reading are disrupted in order to deal with unknown words, the advantage gained by word recognition may not prove to be an advantage for comprehension. As subjects moved through materials which were becoming too difficult for them, it was observed that their reading became jerky, and phrasing deteriorated. When this began to happen, even though few errors were made in word recognition, comprehension deteriorated.

Fourth hypothesis. Two sets of scores as described under the subheading Procedure, namely, transformed scores for the proportion of substitutions semantically acceptable, and frequency scores for the fre-

quency of these substitutions, were employed. Both the proportion of substitutions semantically acceptable on target words and in total context, and the frequency of semantically acceptable substitutions on target words and in total context, were correlated with oral and silent reading comprehension. A significant positive correlation was expected between reading comprehension and semantically acceptable substitutions. As indicated in Table 1, when the proportion of these substitutions on target words and in total context, respectively, was correlated with oral reading comprehension, a nonsignificant Pearson r of .17, and a significant Pearson r of -.29 resulted. Using the frequency of semantically acceptable substitutions on target words and in total context, respectively, with oral reading comprehension, a nonsignificant Pearson r of -.11, and a significant Pearson r of -.29 was obtained. When the proportion of these substitutions on target words and in total context, respectively, was correlated with silent reading comprehension, two nonsignificant correlations of -.21 and -.17 resulted. Using the frequency scores for these substitutions on target words and in total context, respectively, with silent reading comprehension, significant correlations of -.52 and -.67 resulted. Thus, using either the frequency or the proportion of semantically acceptable substitutions, no significant positive correlation was obtained between these substitutions and oral and/or silent reading comprehension. Instead, significant negative correlations were obtained. Thus, the fourth hypothesis was not confirmed.

For the population studied, the frequency or the proportion of

semantically acceptable substitutions appeared to be equally as good as a predictor of oral reading comprehension. Both produced a correlation of -.29 with oral reading comprehension. However, while this correlation is significant, it is very weak. Therefore neither the proportion nor the frequency of semantically acceptable substitutions appear to be a very reliable predictor of oral reading comprehension.

The frequency, however, of semantically acceptable substitutions appeared to be a better predictor of silent reading comprehension than the proportion of these substitutions. The proportion of these substitutions with silent reading comprehension produced no significant correlation, while the frequency of these substitutions produced significant correlations of -.52 and -.67. Furthermore, the frequency of semantically acceptable substitutions appeared to be a better predictor of silent reading comprehension than of oral reading comprehension. A comparison of the correlations of -.29, for the frequency of semantically acceptable substitutions and oral reading comprehension, and -.67, for the frequency of these substitutions and silent reading comprehension, produced a significant difference ($p < .001$).

Insert Table 1 about here

The above results do not agree with those reported in the miscue studies. Y. Goodman (1967) reported a correlation of .40 for the percentage of semantically acceptable substitutions and oral reading comprehension for children in their first year of primary school.

Goodman and Burke (1973) reported a correlation of .36 for a group of 94 students from second to tenth grade. When the grades were considered separately, however, no significant correlation was reported for second grade.

Fifth hypothesis. As with semantically acceptable substitutions, correlations were computed using both the scores for the proportion of substitutions syntactically acceptable and those for the frequency of these substitutions. These correlations were computed for substitutions on target words and for substitutions in total context. No prediction was made as to the strength or direction of the correlations expected between reading comprehension and syntactically acceptable substitutions. When the proportion of substitutions on target words and in total context, respectively, was correlated with oral reading comprehension, the nonsignificant correlations of .02 and -.22 were obtained, as indicated in Table 2. When, however, the frequency of these substitutions on target words and in total context, respectively, was correlated with oral reading comprehension, the significant correlations of -.34 and -.36 were obtained. Using the proportion of these substitutions on target words and in total context, respectively, with silent reading comprehension, the nonsignificant correlations of -.02 and -.14 resulted. Again, when the frequency of these substitutions on target words and in total context, respectively, was correlated with silent reading comprehension, the significant correlations of -.77 and -.75 resulted. No prediction was made as to the strength or direction of the correlations expected in testing this hypothesis. Since signif-

icant negative correlations were obtained between the frequency of syntactically acceptable substitutions and reading comprehension, the fifth hypothesis was supported.

Insert Table 2 about here

For the population studied, either the frequency or the proportion of syntactically acceptable substitutions appeared to be equally as good for predicting oral reading comprehension. The nonsignificant correlation of -.22 between the proportion of these substitutions and oral reading comprehension, is not significantly different from the significant correlation of -.36 for the frequency of these substitutions and oral reading comprehension. Furthermore, both of these correlations are weak. Thus, neither the frequency nor the proportion of syntactically acceptable substitutions would appear to be a very reliable base from which to generate expectations about oral reading comprehension. These results do not support those of the miscue studies. Y. Goodman (1967) reported a correlation of .40 for oral reading comprehension and the percentage of syntactically acceptable substitutions. Goodman and Burke (1973) reported a correlation of .18 for oral reading comprehension and the percentage of these substitutions for a group of 94 students. When grades were considered separately, however, no significant correlation was reported for second grade.

Moreover, for the population studied, the frequency of syntactically acceptable substitutions appeared to be a better predictor of silent reading comprehension than the proportion of these substitutions.

No significant correlations were obtained between the proportion of these substitutions and silent reading comprehension, while significant correlations of -.77 and -.75 were obtained when frequency scores were used. Thus, as with semantically acceptable substitutions, the frequency, and not the proportion, of syntactically acceptable substitutions was the important factor. In addition, the frequency of syntactically acceptable substitutions appeared to be much more reliable for predicting silent reading comprehension than oral reading comprehension. A significant difference ($p < .001$) was obtained when the correlation for the frequency of these substitions and silent reading comprehension (-.75), was compared with the correlation for the frequency of these substitutions and oral reading comprehension (-.36).

Besides, syntactically acceptable substitutions appeared to be equally as good as semantically acceptable substitutions for predicting either oral or silent reading comprehension. No significant difference was obtained when the correlation for the frequency of syntactically acceptable substitutions and oral reading comprehension (-.36) was compared with the correlation for the frequency of semantically acceptable substitutions and oral reading comprehension (-.29). Similarly, no significant difference was obtained when the correlation for the frequency of syntactically acceptable substitutions and silent reading comprehension (-.75) was compared with the correlation for the frequency of semantically acceptable substitutions and silent reading comprehension (-.67). This conclusion could be expected since, in

examining the relationships among the various subclasses of substitutions, a correlation of .93 was obtained between semantically and syntactically acceptable substitutions. Similar correlations for semantically and syntactically acceptable substitutions were reported by the miscue studies.

The categorization of substitutions into their subclasses indicated that the children's control over the syntax of their language was more basic to the reading process than their control over meaning. Of total substitutions in context, about 67% were syntactically acceptable, and about on-half as many, about 33%, were semantically acceptable. Also, about 29% of total substitutions were classified as being both semantically and syntactically acceptable. In other words, most of the semantically acceptable substitutions, about 88%, were at the same time syntactically acceptable, but less than one-half, about 44%, of the syntactically acceptable substitutions were also semantically acceptable. Thus, about 56% of the syntactically acceptable substitutions changed the meaning of sentences. Therefore the children revealed a much greater tendency to make their substitutions conform to the rules of the language they spoke than to the meaning of what they read.

An examination of relationships among the various subclasses of substitutions indicated that the frequency of semantically acceptable substitutions produced significant positive correlations with the frequency of syntactically acceptable substitutions (.93), with the frequency of syntactically unacceptable substitutions (.69), and with the

frequency of semantically unacceptable substitutions (.78). Thus, an increase in semantically acceptable substitutions in reading was accompanied by an increase in syntactically acceptable, syntactically unacceptable and semantically unacceptable substitutions.

Since comprehension is the main goal in reading, substitution errors which are to be ignored must be those which do not negatively affect comprehension. One might expect that if any errors could be ignored, it would be those substitutions which are semantically acceptable, or those which are both semantically and syntactically acceptable. The results of this study, however, do not permit such a conclusion. The frequency of semantically acceptable substitutions is significantly and negatively related to silent reading comprehension. Also, an examination of the relationship of silent reading comprehension to those substitutions which are both semantically and syntactically acceptable, produced a significant negative correlation of -.66. Besides, the frequency of semantically acceptable substitutions is significantly and positively related to the frequency of syntactically unacceptable substitutions and semantically unacceptable substitutions. Therefore, it appears that the frequency with which the various subclasses of substitutions occur in reading is a crucial factor. The frequency with which semantically acceptable substitutions, and those which are both semantically and syntactically acceptable, can occur without being detrimental to comprehension is a question which requires further study.

Furthermore, since significant correlations exist among the var-

ious subclasses of substitutions, possibly a common underlying factor exists among them that is significantly related to reading comprehension. A factor analysis study could possibly identify this underlying factor, and indicate the extent to which each of these variables is independent.

Implications for instruction. The results of this study suggest that context cannot be relied on to solve all word recognition and vocabulary problems. In order to enhance comprehension, therefore, unknown words that are important for an understanding of a lesson, and which a child will not likely recognize through context, need to be taught prior to the reading of the material. Also, accuracy in oral reading appears to be a weak predictor of oral reading comprehension. Yet, in many elementary schools, the oral reading of stories for the purpose of demonstrating the application of phonics and other word skills, is a common practice. As opposed to the current emphasis on oral reading in elementary schools, an increased emphasis on silent reading and on comprehension, with provision for instruction in the application of phonics and other word skills apart from the reading of the story, would likely be more beneficial as far as comprehension is concerned.

The child's oral language is a most important base for reading. The fact that two-thirds of the children's substitutions conformed to the rules of their language is evidence for this statement. Thus, the reading materials that would be most appropriate for beginning readers would be those in which the syntactic patterns of the context

matched those of the child's oral language. The utilization of stories of which the young reader is the author could be beneficial. Furthermore, introducing children to reading materials in which the language structures are more complex than, or different from their own, would be introducing a difficulty for which children require preparation. Such preparation would need to begin at the level of oral language.

In addition, while two-thirds of the children's substitutions conformed to the rules of their language, over half of these syntactically acceptable substitutions changed the meaning of what they read. Therefore, it would appear that emphasis must be directed toward the semantic aspects of reading. The reader must develop an attitude of searching for, and obtaining meaning from everything s/he reads. If this attitude is to be developed, reading instruction must be planned so as to avoid overburdening children with too many difficulties. When children regularly use reading materials which are too difficult for them, they tend not to develop an attitude or habit of reading for meaning.

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Table 1

Correlations for Oral Reading Comprehension[a] and Silent Reading Comprehension[b] with Semantically Acceptable Substitutions[c]

Variables correlated	On target words		In total context	
	r	z	r	z
ORC and SA (TS)[d]	.17	1.05	-.29	1.82*
ORC and SA (FS)[e]	-.11	.67	-.29	1.82*
SRC and SA (TS)	-.21	1.30	-.17	1.05
SRC and SA (FS)	-.52	3.51**	-.67	4.93***

Note. Number of students = 40

All tests of significance were one-tailed tests.

[a] ORC

[b] SRC

[c] SA

[d] Transformed scores for proportion of substitutions were used.

[e] Frequency scores for frequency of substitutions were used.

*$p < .03$

**$p < .0002$

***$p < .00003$

Table 2

Correlations for Oral Reading Comprehension[a] and Silent Reading Comprehension[b] with Syntactically Acceptable Substitutions[c]

	On target words		In total context	
Variables correlated	r	z	r	z
ORC and SYNA (TS)[d]	.02	.12	-.22	1.36
ORC and SYNA (FS)[e]	-.34	2.15*	-.36	2.29**
SRC and SYNA (TS)	-.02	.12	-.14	.86
SRC and SYNA (FS)	-.77	6.20***	-.75	5.92***

Note. Number of students = 40

All tests of significance were two-tailed tests.

[a] ORC

[b] SRC

[c] SYNA

[d] Transformed scores for proportion of substitutions were used.

[e] Frequency scores for frequency of substitutions were used.

*$p < .03$

**$p < .02$

***$p < .0001$